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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/596,549	06/19/2000	Andrew Booth	213201.00054	2122
27160	7590	12/01/2004	EXAMINER	
PATENT ADMINSTRATOR KATTEN MUCHIN ZAVIS ROSENMAN 525 WEST MONROE STREET SUITE 1600 CHICAGO, IL 60661-3693			LUK, EMMANUEL S	
			ART UNIT	PAPER NUMBER
			1722	
DATE MAILED: 12/01/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/596,549

Applicant(s)

BOOTH ET AL.

Examiner

Emmanuel S. Luk

Art Unit

1722

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-22 and 28-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-22 and 28-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/8/04 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-3, 7-9, 14-21 and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al in view of Manov et al and Iden (4817419).

Lin teaches an aluminum substrate thick film heater having ceramic oxide dielectric insulator and the substrates having resistive layers. Lin also teaches the heating element circuit pattern (108) is applied over the dielectric layer (106) that ends in the terminal foils (110) for connection to a power source, an insulative layer (114) is applied over the other layers, and thick film ink (Col. 5, lines 21-39). Lin also teaches the substrates and the circuit patterns:

In FIG. 2 a circuit element is shown applied over a flat substrate. In FIG. 3 a circuit pattern is shown over a tubular substrate. A plurality of other substrate and circuit pattern designs may be implemented. For example, the substrate could have irregular contours and the circuit patterns can have irregular continuous traces. (Col. 6, lines 34-40).

Lin fails to teach a trace in pattern that is discontinuous circumferentially and silk screened and thick film ink.

Lin teaches a circuit design on a substrate (Fig. 2) and also a substrate design on a heater body (Fig. 3). Manov teaches teaches the creation of a trace pattern on a heater that is discontinuous circumferentially on the heater body and a slot runs longitudinal to the heater body.

Lin teaches formation of the pattern on both a flat substrate and on a heater body that is cylindrical, the design of the pattern can be designed as desired and to accommodate for features of the substrate.

Iden teaches a circuit that is attached to a thick film contact pad conductor (Col. 3, lines 28-29) and the "contact pads and resistor areas are applied to the substrate by the silk-screen technique using fine mesh stainless steel screen" (Col. 3, lines 32-35). Iden teaches the resistive areas that are formed by the thick film ink.

It would have been obvious to one of ordinary skill in the art to modify Lin with a discontinuous circumferential design as taught by Manov for ease in manufacturing of the pattern on a cylindrical body and contact pads and resistive trace formed by thick film ink as taught by Iden because thick film technology is used for formation of electrical high density miniature circuits on a supporting substrate (Col. 2, lines 49-52).

In regards to claims 17-19, the dielectric strength of the dielectric layer, the insulation resistance and the thermal expansion coefficients are cause effective variables that can be determined through routine experimentation. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as through routine experimentation in the absence of a showing of criticality in the claimed properties such thermal expansion coefficient, resistance and dielectric strength. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In regards to claim 31, the plurality of traces it would have been obvious to one of ordinary skill in the art to have a plurality of traces for a multiplied effect, in this case for improved heating. *In re Harza*, 124 PQ 378 (CCPA 1960). It would have been obvious to one skilled in the art to find the optimized pattern.

In regards to claims 20 and 21, the respective layer being formed by photoforming, laser etching and abrasive etching is process limitations that are not given weight in an apparatus claims because it does not provide further structural limitations.

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5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al in view of Manov et al and Iden (4817419) as applied to claims 1-3, 7-9, 14-21 and 28-31 above, and further in view of Schmidt.

Lin fails to teach a longitudinal slot.

Schmidt teaches a band heater clamp arrangement for an injection molding machine. Schmidt teaches an inner sleeve having an axial slot that extends through the entire length that allows for the inner sleeve to expand and close as temperature rises, thus allowing for the different thermal expansion rates between the inner sleeve and outer sleeve (Col. 2, lines 41-47).

It would have been obvious to one of ordinary skill in the art to modify Lin with an axial slot as taught by Schmidt because it allows for heater to compensate for the thermal expansion of the substrate that is located on the inner sleeve.

6. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Manov and Iden (4817419) as applied to claims 1-3, 7-9, 14-21 and 28-31 above, and further in view of Riley.

Lin fails to teach the contact is made from gold plated steel.

Riley teaches a thick film circuit element having substrates and layers that are formed via silk screen (Col. 3, line 67) onto the surfaces of the substrate (12). The substrates can be made of ceramic (Col. 3, line 65), other substrates include stainless steel (Col. 2, lines 65-66) and noble metals, such as gold (Col. 1, line 41) for use in the circuit. Riley teaches the use of a variety of different materials in the substrates, this

also suggests use in parts other than substrates including the housing and contact pads, such as a ceramic housing and gold plated steel on the contact pads.

It would have been obvious to one of ordinary skill in the art to modify Lin with contact as taught by Riley because it allows for the desired properties of the contact for the heater.

7. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Manov et al and Iden (4817419) as applied to claims 1-3, 7-9, 14-21 and 28-31 above, and further in view of Collins.

Lin fails to teach the resistive layer comprises of a resistive trace and a lower-resistance conductive trace.

Collins teaches the formation of a thick film resistor and utilizes a resistive layer and a low-resistance conductive trace:

Each of the networks was fabricated on insulative alumina substrates by direct writing of the resistive line pattern *r* using commercially available ruthenium-based inks of different compositions (different sheet resistivities), whereby each pattern was written to achieve a different final effective width of the line *r* for the resistor segments. Both segments of each resistor network were written with one and the same line width. The effective line widths of the low resistance segments were achieved by writing a selected number of resistive lines in a parallel configuration between conductive terminal bars connected to respective conductive terminations. (Col. 6, lines 15-26)

The low resistance segments being the conductive trace, thereby low resistance, that is located with resistive lines (resistive trace) that forms the resistive layer, the patterning allows for optimum use of the resistive layer.

It would have been obvious to one of ordinary skill in the art to modify Lin with a resistive layer comprised of a resistive trace and a conductive trace as taught by Collins because it allows for optimum configuration for the resistive trace pattern in the heater.

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8. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Manov et al and Iden (4817419) as applied to claims 1-3, 7-9, 14-21 and 28-31 above, and further in view of Osuna-Diaz et al.

Lin fails to teach a detente.

Osuna-Diaz et al teaches a threading (24, 36) that locks the heater (28) into the place in relation to the nozzle. Instead of a detente being utilized to lock the substrate into position, one skilled in the art would recognize other fastening means including threads to hold a removable substrate into position surrounding a nozzle. It would have been obvious for the contacts to be situated so that when the substrate is locked into position that the contact pads would be in contact for the heater to work.

It would have been obvious to one of ordinary skill in the art to modify Lin with threads to place and lock a heater into place surrounding a nozzle as taught by Osuna-Diaz because it allows for the substrate to be removed and replace for ease of maintenance of the apparatus.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Manov et al and Iden (4817419) as applied to claims 1-3, 7-9, 14-21 and 28-31 above, and further in view of Schmidt and Goldwin (EP 0963829 A1).

Lin fails to teach the connector housing having a key for slidably engaging a longitudinal slot in the substrate.

Goldwin teaches an injection molding heater around a nozzle (130) comprising of a thin film heater (132) that has a connector (138), or key, that ensures the heater stays



connected to the nozzle (Fig. 14A). One skilled in the art recognizes the above view of the nozzle and heater that the connector would be in a slot of the heater for engagement. The connector and slot also inherently ensures proper alignment of the heater with the nozzle for any desired configuration such as aligning with contact pads.

Additionally, Schmidt teaches a band heater clamp arrangement for an injection molding machine. Schmidt teaches an inner sleeve having an axial slot that extends through the entire length that allows for the inner sleeve to expand and close as temperature rises, thus allowing for the different thermal expansion rates between the inner sleeve and outer sleeve (Col. 2, lines 41-47).

It would have been obvious to one of ordinary skill in the art to modify Lin with a slot and key as taught by Goldwin because it ensures interchangeable heaters to the nozzle that can be aligned accordingly and a slot as taught by Schmidt because it allows for heater to compensate for the thermal expansion of the substrate that is located on the inner sleeve.

### ***Response to Arguments***

10. Applicant's arguments filed 9/8/04 have been fully considered but they are not persuasive. The applicants argue that there is no motivation for combining the prior art references. However, both Lin and Manov teaches patterns for cylindrical heaters. Also, newly presented Iden teaches substrates that can be formed from thick film ink. In response to the applicant's argument, the prior art does not teach nor does it teach away that thick film printing can be done on a non-flat substrate. However, both Lin and

Manov teach the creation of a circuit on various surfaces with different patterns and thick film printing is a well known method for the circuits. It would have been obvious to one of ordinary skill in the art to be familiar with thick film printing techniques.

In regards to claim 4, Schmidt teaches the use of slots in the sleeve bodies. To clarify the rejection, Schmidt is used to reject claim 4 in a separate dependent rejection from the independent claim. Schmidt is relevant to the claims since it allows for rates of expansion in heater bodies, especially for different substrate layers.

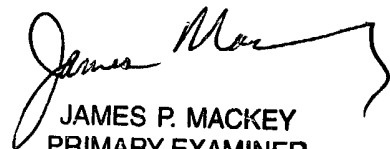
### ***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel S. Luk whose telephone number is (571) 272-1134. The examiner can normally be reached on Monday-Thursday 7 to 4 and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ben Utech can be reached on (571) 272-1137. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EL

  
JAMES P. MACKEY  
PRIMARY EXAMINER

11/29/04